cross-infection experiments with *R. Solani*, and (6) a description of the growth of this fungus in various media.

The numerous cross-infection experiments carried out with *Rhizoctonia Solani* are of special interest. Strains of the fungus from some 30 species of plants were used to infect carnations in several stages of growth, from the cutting to the mature plant, both under glass and in the field. A number of other plants also were infected with various strains of *Rhizoctonia*. The results of all these cross-infection experiments can best be stated in the author's own words: "From these inoculation experiments with a large number of different types of plants, we must conclude that all the strains studied, which were obtained from a wide range of hosts of diverse geographical origin, can attack the same species of plant and produce the same characteristic symptoms. No marked specialization was noted in any of the strains. Thus, all the strains studied can be included under one form, *Rhizoctonia Solani* Kühn. The inoculation experiments show further that the virulence of *R. Solani* is very variable, as is also the degree of resistance of the various host plants, both depending upon a number of factors." A study of the growth characteristics confirmed this general conclusion. Strains isolated from the same host species showed differences as great as those between strains isolated from different species.

MATZ[7] has described a form of *Rhizoctonia* occurring on the leaves and stems of *Ficus Carica* at Gainesville, Florida. This form is regarded by him as a distinct species, *R. microsclerotia* Matz. Aside from its foliicolous habit, it does not appear to differ essentially from *R. Solani*, which MATZ found was also capable of infecting fig leaves, without producing sclerotia, however. In a single experiment the fig fungus failed to infect seedlings of the cowpea, while *R. Solani* killed 90 per cent of the young plants.—H. HASSELBRING.

The number of chromosomes.—Partial lists of the number of chromosomes reported by various observers for various plants have been published from time to time, but the lists have been incidental and usually no authority has been cited. The most complete of these earlier lists is that of TISCHLER (Progressus Rei Botanicae 5:164–284. 1915). ISHIKAWA[8] has compiled the most complete list ever published, and in each case has cited the authority. Besides, he has counted the chromosomes in several forms which are here reported for the first time. The theoretical interpretation of chromosomes and their value in phylogenetic studies will be considered later. In sexual forms, the x and $2x$ numbers are cited in separate columns; in asexual forms, the numbers are cited in the x column.

A mere glance at ISHIKAWA's tables reveals some interesting facts. In the Flagellates most of the numbers are preceded by the sign $\pm$, indicating an

[7] MATZ, J., A *Rhizoctonia* of the fig. Phytopathology 7:110–117. 1917.

[8] ISHIKAWA, M., A list of the number of chromosomes. Bot. Mag. Tokyo 30: 404–448. *figs. 32.* 1916.

estimate rather than an exact count. All of the Myxomycetes show 8 as the x number; in the diatoms only 3 genera are cited, the x numbers being 4, 8, and 64, the latter with 128 as the $2x$ number; in the Conjugatae 12 is the prevailing number, and in most cases the $2x$ is not cited; in the Chlorophyceae the x numbers are various, ranging from 6 to 32, but no $2x$ numbers are given; in the Phaeophyceae the x numbers are 16, 18, 22, 24, and 32, with the expected $2x$ numbers; in Characeae the x numbers are 21 and 16, but no $2x$ numbers are cited; in Rhodophyceae 8 forms are given, with x numbers ranging from 7 to 24 and with the corresponding $2x$ numbers. In the fungi the numbers are low and the $2x$ numbers are given in comparatively few cases; the minimum x number is 2, and it has been noted in 2 species; 4 appears in 24 species; very few have more than 8 as the x number; and the maximum number (16) is cited in 6 cases. In the bryophytes 8 is the prevailing x number, having been noted in 12 species, while 4 has been counted in 6 species, and 12 in one case and 6 in another. The $2x$ numbers have been counted in nearly all cases. In the mosses the x number ranges from 6 to 24, with 6 (counted in 6 species) as the prevailing number. In the pteridophytes the numbers are comparatively high, the x number ranging from 4 to 120, and 24 of the 35 species cited have 32 or more, while only one (*Salvinia*) shows the minimum number. In the gymnosperms 12 and 24 have appeared so constantly as the x and $2x$ numbers that any other countings need to be very thoroughly supported; 34 species with 12 as the x number are cited, and 3 which are cited as having 8 chromosomes are now known to have 12, but there are still 6 species in which the number 8 has not been disputed. Other numbers are 6, 10, and 16. Of the 44 pages of citation, 28 are devoted to angiosperms. The x number ranges from 3 in *Crepis virens* to 45 in *Chrysanthemum arcticum*. The average number is higher in the dicotyledons than in monocotyledons, and the most frequent x numbers are 8, 12, and 16.

The list is valuable not only for the systematically arranged citations of chromosome counts, but also because it brings together a considerable portion of the cytological literature in which the chromosome appears either as a principal or as an incidental feature.—CHARLES J. CHAMBERLAIN.

Stomatal regulation.—From rather extensive experimentation upon ivy and laurel (*Prunus Laurocerasus*), DARWIN[9] concludes that transpiration is regulated by size of stomatal aperture, and that "LLOYD's dictum 'their (stomates) regulatory function is almost nil' " must be abandoned. The stomatal aperture was determined by use of his well known potometer, which determines the rate of flow of air through the stomates under a given pressure. The rate of transpiration was determined by weighing or by use of the potometer. Modification of stomatal aperture was induced by normal daily changes or

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[9] DARWIN, F., On relation between transpiration and stomatal aperture. Phil. Trans. Roy. Soc. London B **207**:413–437. 1915.